

WELL SUMMARY

page 1 of 9

Location ID: PL-6-B Field Representative(s): Contaldo, Canavan, Egan, Huber
Kirby, Menzie, Morse, Rogers,

Date Started: 11/30/90 Date Completed: 06/14/91

Northing: 227115.15 Easting: 399683.92

Brass Cap: 4481.69 Outer Casing: 4482.10 Inner Casing: 4482.46

Drilling Method: Mud Rotary Drilling Contractor: Beylik Drilling Co.

Driller: T. Grossi, G. Welts, C. Jenkins, J. Jenkins

Total Depth Borehole: 1920' Total Depth 4" Well Casing: 1860'

Total Depth Surface Casing: 16.5'

Diameter Well Casing: 4.0" Diameter Surface Casing: 14"

Length of Bottom Blank: 20.0'

Type of Screen: Extra strength 0.02 slot

Screen Intervals: 9 screened intervals (see well completion diagram)

Water First Detected: NA Water Level Open Borehole: NA

Water Level Cased Borehole: NA

Quik-Foam Use: NA

Estimated Water Use: 207,000 gallons (see water budget)

Well Casing:

4in x 3ft SCD 40 PVC:

4in x 5ft SCD 40 PVC:

4in x 10ft SCD 40 PVC:

4in x 20ft SCD 40 PVC:

Total SCD 40 PVC pipe: 0 ft

stock SS centralizers: 8

custom SS centralizers: 4

4"x2' SS locking riser:

4" SS locking cap:

4" SS female cap: 0 ft

4in x 3ft SCD 5 SS pipe:

4in x 5ft SCD 5 SS pipe:

4in x 10ft SCD 5 SS pipe:

4in x 20ft SCD 5 SS pipe:

Total SCD 5 SS pipe: 0 ft

4in x 5ft SCD 10 SS pipe:

4in x 10ft SCD 10 SS pipe:

4in x 20ft SCD 10 SS pipe: 89

Total SCD 10 SS pipe: 1770 ft

Extra strength screen: 9 ft

Well Completion:

100# bags 16/40 sand:	0	bags
100# bags 10/20 sand:	0	bags
100# bags 8/14 sand:	0	bags
100# bags 8/20 sand:	947	bags

94# bags cement:	294	bags (grout)
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5 gal. buckets bentonite:	0	buckets
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50# bentonite powder:	28	bags (grout)
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Benseal:	645	bags
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Surface Casing:

94# bags cement:	30	bags
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50# bags bentonite powder:	0	bags
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Grout:	0	bags
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Pertinent Field Notes:

11/29/90	Beylik arrives on-site, began mobilizing equipment to drill site, worked on fixing rig, and set up rig. - Contaldo
11/30/90	Drilled from 0-16.5' using 24" auger bit (no mud). Set 14" - diameter surface casing to 16.5'. Grouted surface casing. - Contaldo
12/01/90	Equipment set up and maintenance. Health and safety discussion and new procedures discussion with Beylik personnel. - Morse
12/02/90	Installed pump and worked on replumbing goose. 5 truck loads of water to Baker Tank. - Contaldo
12/03/90	Drilled from 17' to 86' using mud rotary with 12¼" tricone (button) bit. No deviation surveys today. Still relatively unconsolidated alluvium. Drilling about 20-30 minutes per 10'. At ≈ 30' pulled bit and put new stabilizer assembly (bit, roller reamer, stabilizer) into hole.

- 12/04/90 Drilled from 86'-294' using mud rotary. Same bit. Drill rates 20-70 minutes/10 ft. Using \approx 4000 gallons water per day. Running drift surveys every 60'-80'. Beylik and SW Surveys measure \approx 0.25° - 0.3° deviation.
- 12/05/90 Drilled 294'-365' using mud rotary. Ran Beylik deviation surveys at 294' and 313'. Drift at 313' showed 0.7° . Called SW Surveys. Mick ran drift survey in drill pipe and open borehole. Used \approx 2500 gallons water.
- 12/06/90 Drilled 365'-465' using mud rotary. Ran Beylik deviation surveys at 347', 404', and 453'. SW Survey tool run at 433' (Borehole O.K.). Make new mud, used \approx 3K gallons water. Need to implement HNU monitoring (breathing zone).
- 12/07/90 Drilled 465'-593' using mud rotary. Ran Beylik survey tool at 533', 553', and 573'. Three loads water delivered. Using \approx 4000-6000 gallons per day.
- 12/08/90 Continue drilling at 593'. SW Survey results = $.47^\circ$ deviation at 593'. Ran additional surveys at 611' and 633'. Hauled 5 loads water. Mixed new batch of mud. Drilled 593'-655'. Beylik survey tool varies between $.75^\circ$ and $> 1.0^\circ$ at 633'.
- 12/09/90 Continued drilling to 665' when drill bit assembly sheared off downhole (0514 hrs). Beylik on down time until remaining drill pieces are fished from borehole. Ordered wrong grapples twice.
- 12/10/90 Fished out bit assembly on 3rd try. Hauled 7200 gallons water. Used 800-1000 gallons mixing mud. New down hole assembly has 5 x 30' drill collars and two additional I.B.S.'s.
- 12/11/90 Continued drilling 665'-746'. Deviation survey at 746' \approx 1.4° . Pulled tools to run open hole survey.
- 12/12/90 Tripped out and ran open hole survey. SW surveys determined TD to be 733'. Beylik re-tallied pipe; totaled 737.07'. Will use pipe tally. Tripped in and resumed drilling. Drilled to 758'.
- 12/13/90 Drilled 758' - 829.5'. Took deviation survey (Beylik) at 760' with deviation at \approx 1.5° . Took another at 790'. Beylik showed deviation to be 1.25° . Southwest surveys took log also in drillstring. At 790' = 1.1° - 1.2° . Resume drilling at 817'.
- 12/14/90 Continue drilling at 829'. Beylik drift survey at 837' reads 1° and 1.1° . At \approx 887' driller said he thinks a collar may have sheared off. Tripping out of hole to first drill collar.
- 12/15/90 Tripped out of hole to second drill collar where shear at the pin occurred. Tripped back down hole with overshot fishing device to retrieve collar #3. Tripped back in hole only to find the drill stem plugged. Tripped out to clear blockage then back in.
- 12/16/90 Drilled 886'-903'. Shut down due to worn Kelly bar.

12/17/90 Repaired swivel assembly.

12/18/90 Tripped in hole and drilled 912' - 949.5'.

12/18/90 Slow penetration rates starting at $\approx 930'$. Some sloughing at 910'.

12/19/90 Drilled 949.5' - 1019'. Deviation readings at 997'; 1.2° and 0.75° .

12/20/90 Drilled 1019' - 1080'. May have twisted off at 1080'; began tripping out to find out if tool twisted off.

12/21/90 Finished trip out of borehole. Tools are fine. Change bit while out of hole. M. Peterson (SW Surveys) logs drift in open borehole. 10.09' of stepout in 1050' of borehole ($< 1\%$). Trip in and continue drilling at $\approx 1080'$. Drilled to $\approx 1117'$ by midnight.

12/22/90 Continue drilling 1117'-1215'. Drift survey (Beylik) at 1140' (tool at 1115') read 0.75° . Drift survey at 1200' (tool lowered to 1175') read 0.8° .

12/23/90 Drilled 1215' - 1320'. Ran drift survey at 1260' (tool lowered to 1230'), target read $.95^\circ - 90^\circ$. Indicates hole is drifting toward 1.0° mark.

12/24/90 Drilled 1320' - 1340'. Draw works on rig failed. Tripped out all drill pipe using Lockheed crane.

12/25/90 Conducted open borehole deviation survey. True vertical depth = 1339.8', step-out = 13.82'.

12/26/90 to
12/29/90 No drilling conducted. Beylik waiting for draw works from Portadrill.

12/30/90 Tripped in drill pipe. Drilled 1340' - 1370'.

12/31/90 Drilled 1370' - 1412'. Beylik drift survey at 1390' shows 0.75° deviation.

01/01/91 Drilled 1412' - 1505'.

01/02/91 Drilled 1505' - 1570'. Drift survey in open borehole at 1570' shows 12.53' step out.

01/03/91 Drilled 1570' - 1662'.

01/04/91 Drilled 1662' - 1766'. Beylik drift survey at 1750' shows 0.35° deviation.

01/05/91 Drilled 1766' - 1844'.

01/06/91 Drilled from 1844' to 1910'. Circulated hole at 1910'.

01/07/91 Tripped out. SW surveys ran full suite of geophysical logs. Actual TD = 1920'. Designed well.

01/08/91 Completed installing 4" stainless steel casing (sch 10) and screens (extra strength). Installed lowermost plug to 1846'.

01/09/91 Installed plugs and sand packs to 1758'.

01/10/91 Continued installing plugs and sand packs to 1440'.

01/11/91 Continued installing plugs and sand packs to 990'.

01/12/91 Continued installing plugs and sand packs to 714'.

01/13/91 Continued installing plugs and sand packs to 417'.

01/14/91 Installed last bentonite plug to 299'. Installed first load of grout to 100'.

01/15/91 Installed tremie to 1850' and began discharging water. Pumped 2 stock tanks of SAPP water (\approx 2000 gallons total) using 2 bags of SAPP per 1 stock tank of fresh water. Surged screen #1 (lowermost).

01/16/91 Continue surging screens #2 - #9. Finish surging and blow water from bottom of hole.

01/17/91 Continue development by water jetting each screened interval with SAPP solution. Jet screens #1 - #3 and change water. Continue jetting in screen #4. Finished for day with screen #5.

01/18/91 Jet screens #6 through #9. Change development water and add new SAPP after screen #6 (1030'-1040') and before screen #7 (910'-920').

01/19/91 Pumped 5000 gallons of clean water through the well to flush system and complete water-jetting phase of development. Pulled all tremie and secured well.

01/20/91 Beylik continued to clean well site and began demobilization. Finished wellhead completion.

01/21/91 Beylik completed cleaning well site and continued demobilization.

01/22/91 Beylik leaves site. GCL prepares to do the development of this well. Development will consist of packing off each screened zone, in-line surging with a surge block followed by air-lift pumping.

02/01/91 Assemble and surface test packer assembly to be used during development.

02/02/91 Steam clean fiberglass tremie pipe, packer assembly, and pulling unit

02/06/91 Begin lowering packer assembly down hole on fiberglass tremie.

02/07/91 Added 8 pieces tremie to string in well (14 plus "lower packer only" assembly). Bottom of string at \approx 1200 gal. from screen #9, pumped off one full stock tank to

lined pit. See development sheets in PL-6-B well file for more details. has been removed from well. Water is turbid (>100 NTU's)

02/08/91 Continue development of PL-6-B screen zone #9. A total of 3,000 gallons water

02/11/91 Continue development of PL-6-B screen zone #9. Two thousand gallons discharged today for a total of 5,000 gallons.

02/12/91 Continue development of screen #9, lifted about 400 gallons of muddy water by surging. Crown pulley broken on pulling unit. Down for repairs.

02/13/91 Continue line surging in screen #9. Water still very turbid.

02/14/91 Continue surging screen #9. Water slightly better than yesterday, but still turbid.

02/15/91 Continued surging screen #9. Discharge water finally clears enough to begin air-lifting. Turbidity still >100 NTU's.

02/19/91 Installed air-lift assembly and began air-lifting in screen #9. Turbidity is very low. (5.6 NTU's).

02/20/91 Continue air-lifting. Turbidity drops to 2.1 NTU's. Stop air-lifting and move to screen #8.

02/21/91 Surge screen #8. Discharge is turbid.

02/22/91 Finish surging and begin air-lifting screen #8. Air-lift over weekend.

02/25/91 Continue air-lifting in screen #8 after lifting all weekend (until 6 p.m. Sunday). Turbidity drops to 1.2 NTU's by noon. Stop air-lifting, move down to screen #7 and begin surging.

02/26/91 Surged screen #7 all day.

02/27/91 Surged screen #7 then switched to air-lift by late afternoon. Let air-lift run overnight.

02/28/91 Continue development of screen #7 by air-lifting. Turbidity \approx 30 NTU's.

03/01/91 Continue air-lifting in screen #7 and air-lift over weekend.

03/04/91 After air-lifting all weekend turbidity drops to 3.7 NTU's. Screen #7 developed. Move to screen #6 and begin surge development.

03/05/91 Continue with development of screen #6 by surging.

03/06/91 Finish surging screen #6, start air-lifting.

03/07/91 Continue air-lifting.

03/08/91 Finish air-lifting screen #6. Turbidity = 4.4 NTU's.

04/01/91 Move to screen #3, begin initial development by surging.

04/02/91 Continue surging screen #3. Turbidity >> 100 NTU's.

04/03/91 Continue surging screen #3.

04/04/91 Continue surging screen #3. Turbidity >> 100 NTU's.

04/05/91 Finish surging screen #3. Begin air-lifting.

04/08/91 Continue air-lifting screen #3.

04/09/91 Continue air-lifting screen #3.

04/10/91 Continue air-lifting screen #3. Turbidity > 100 NTU'S.

04/11/91 Continue air-lifting screen #3.

04/12/91 Continue air-lifting screen #3.

04/15/91 Continue air-lifting screen #3.

04/16/91 Continue air-lifting screen #3.

04/17/91 Continue air-lifting screen #3. Turbidity > 100 NTU's.

04/18/91 Continue air-lifting screen #3.

04/19/91 Continue air-lifting screen #3.

04/22/91 Continue air-lifting screen #3. Turbidity down to 19 NTU's. T. Thomas and G. Contaldo decide to move down to screen #2 because of the length of time it's taking to develop screen #3.

04/23/91 Begin initial development of screen #2 by surging.

04/24/91 Continue surging screen #2.

04/25/91 Continue surging screen #2. Turbidity > 100 NTU's.

04/26/91 Finish surging screen #2 and begin air-lift development for screen #2. Turbidity >> 100 NTU's. Air-lift over weekend.

04/29/91 Finish development screen #2 by air-lift. Turbidity down to 3.6 NTU's. Move back up to screen #3, surge screen #3 for ½ day then start air-lifting screen #3 again.

04/30/91 Continue air-lift development of screen #3.

05/01/91 Continue air-lift development of screen #3. Turbidity 6 - 7 NTU's.

05/02/91 Finish development of screen #3. Turbidity down to \approx 7 NTU's.

05/03/91 Deflate packers and remove air line.

05/06/91 Pull all tremie and packers from well, reconfigure packer assembly for lowest screen #1 begin tripping all tremie and single packer back in well.

05/07/91 Finish installing tremie and new packer assembly to \approx 1827', begin initial development of screen #1 by surging.

05/08/91 Continue surging screen #1.

05/09/91 Continue surging screen #1. Packer pressure suspiciously low.

05/10/91 Tripped out all tremie and packer assembly and found nitrogen leak in packer was preventing packer inflation.

05/11/91 Trip all tremie and second packer back in well. Packer inflates properly. Begin surging screen #1 again. Return leaky packer to manufacturer for repair.

05/14/91 Continue surging screen #1.

05/15/91 Continue surging screen #1.

05/16/91 Continue surging screen #1.

05/17/91 Continue surging screen #1. Turbidity $>>$ 100 NTU's.

05/20/91 Attached additional stainless steel cable to pulling unit (was 900', now 1850' long). Continue surging screen #1.

05/21/91 Appears to be a leak in air line; single packer used for screen #1 and sump is not inflating. Move into sump and start surging without using packer.

05/22/91 Move deeper into sump and continue waiting for the repaired packer to arrive from manufacturer.

05/23/91 Continued surging in well sump.

05/24/91 Continued surging in well sump. Still waiting for packer; it should arrive Tuesday (5/28). Start tripping out fiberglass tremie.

05/27/91 No field work today.

05/28/91 Finish tripping out tremie pipe. Steam clean new (repaired) packer and assembly. Surface tested old (failed) packer and discovered it's leaking at one end (the

packers appear to be feeling the effects of depth). Begin trip into well with new packer.

- 05/29/91 Finish installing tremie. Begin air-lifting in screen #1.
- 05/30/91 Continue air-lifting. Turbidity > 100 NTU's.
- 05/31/91 Continue air-lifting in screen #1.
- 06/03/91 Continue air-lifting.
- 06/04/91 Continue air-lifting turbidity > 100 NTU's.
- 06/05/91 Continue air-lifting in screen #1.
- 06/06/91 Stop developing screen #1 even though turbidity is > 100 NTU's because of time/money considerations. 214,403.5 gallons (estimated) was discharged from PL-6-B during development. Deflate packers and begin tripping out tremie.
- 06/07/91 Finished tripping out tremie pipe and packer assembly. Lay out all Westbay casing materials needed for installation on 06/10/91.
- 06/10/91 Begin installing Westbay casing within 4" stainless steel casing.
- 06/11/91 Finish installing Westbay casing. (for more detail on well design and installation see completion diagram in PL-6-B well file)
- 06/12/91 Inflated 8 of the 17 packers.
- 06/13/91 Finish inflating all the packers in PL-6-B (for more detail on packer inflation pressures and volumes see packer inflation forms in PL-6-B well file). Well is completed.
- 06/14/91 Well handed over to Lockheed for pressure profiling, K-testing, and sampling.